1904MNRAS..65..151.

lxiv. 572. Reference No. 16. *For* 0·38 *read* 0·68 (last column). Delete "term omitted by Airy."
" " 30. *For* 0·43 *read* 0·73 (last column). Delete "term omitted by Airy."
" 691. *For* argument 2ω *read* $180^\circ + 2\omega$.

Mean Areas and Heliographic Latitudes of Sun-spots in the Year 1903, deduced from Photographs taken at the Royal Observatory, Greenwich, at Dehra Dûn (India), and in Mauritius.

(*Communicated by the Astronomer Royal.*)

The results here given are in continuation of those printed in the *Monthly Notices*, vol. lxiii. p. 464, and are deduced from the measurements of photographs taken at the Royal Observatory, Greenwich, at Dehra Dûn, India, and at the Royal Alfred Observatory, Mauritius.

Table I. gives the mean daily area of umbræ, whole spots, and faculæ for each synodic rotation of the Sun in 1903; and Table II. gives the same particulars for the entire year 1903 and the two preceding years for the sake of comparison. The areas are given in two forms: first, projected areas, that is to say, as seen and measured on the photographs, these being expressed as millionths of the Sun's apparent disc; and next, areas as corrected for foreshortening, the areas in this case being expressed in millionths of the Sun's visible hemisphere.

Table III. exhibits for each rotation in 1903 the mean daily area of the whole spots (corrected for foreshortening), and the mean heliographic latitude of the spotted area, for spots north and for spots south of the equator; together with the mean heliographic latitude of the entire spotted area, and the mean distance from the equator of all spots; and Table IV. gives the same information for the year as a whole, similar results for 1901 and 1902 being added, as in the case of Table II. Tables II. and IV. are thus in continuation of the similar tables for the years 1874 to 1888 on pp. 381 and 382 of vol. xlix. of the *Monthly Notices*, and for the years 1889 to 1902 on pp. 465 and 466 of vol. lxiii.

The rotations in Table I. and Table III. are numbered in continuation of Carrington's series (*Observations of Solar Spots made at Redhill*, by R. C. Carrington, F.R.S.), No. 1 being the rotation commencing 1853 November 9. The assumed prime meridian is that which passed through the ascending node at mean noon of 1854 January 1, and the assumed period of the Sun's sidereal rotation is 25·38 days. The dates of the commencement of the rotations are given in Greenwich civil time, reckoning from mean midnight.

1904MNRAS..65..151.

TABLE I.

No. of Rotation.	Date of Commencement of each Rotation.	No. of Days on which Photographs were taken.	Mean of Daily Areas.					
			Projected.			Corrected for Foreshortening.		
			Umbræ.	Whole Spots.	Faculæ.	Umbræ.	Whole Spots.	Faculæ.
659	1902. d Dec. 31·09	27	4	31	225	3	25	228
660	1903. Jan. 27·42	27	21	127	535	17	102	611
661	Feb. 23·77	24	18	100	396	14	85	455
662	Mar. 23·08	26	85	542	769	66	425	762
663	Apr. 19·36	27	42	270	877	30	199	1053
664	May 16·60	27	5	42	574	4	33	602
665	June 12·81	25	64	352	1018	42	249	1037
666	July 10·00	23	42	234	1261	30	175	1379
667	Aug. 6·21	27	34	183	1371	21	122	1480
668	Sept. 2·46	26	17	95	769	17	93	846
669	29·73	27	188	1438	813	145	1188	959
670	Oct. 27·02	27	224	1422	1192	171	1080	1401
671	Nov. 23·33	27	138	854	1312	103	656	1535

TABLE II.

Year.	No. of Days on which Photographs were taken.	Means of Daily Areas.					
		Projected.			Corrected for Foreshortening.		
		Umbræ.	Whole Spots.	Faculæ.	Umbræ.	Whole Spots.	Faculæ.
1901	359	14	41	23	8·6	29	29
1902	349	14	86	163	10	62	178
1903	350	67	434	870	51	339	969

TABLE III.

No. of Rotation.	Date of Commencement of each Rotation.	No. of Days on which Photographs were taken.	Spots North of the Equator.		Spots South of the Equator.		Mean Heliographic Latitude of Entire Spotted Area.	Mean Distance from Equator of all Spots.
			Mean of Daily Areas.	Mean Heliographic Latitude.	Mean of Daily Areas.	Mean Heliographic Latitude.		
659	1902. d Dec. 31·09	27	16	° 22·44	9	° 14·92	° + 8·31	° 19·59
660	1903. Jan. 27·42	27	70	23·43	32	18·08	+10·37	21·75
661	Feb. 23·77	24	62	19·82	23	22·26	+ 8·48	20·48
662	Mar. 23·08	26	137	21·47	288	18·97	− 5·95	19·78
663	Apr. 19·36	27	152	19·14	47	15·66	+10·95	18·33
664	May 16·60	27	24	18·07	10	25·07	+ 5·69	20·08
665	June 12·81	25	96	20·79	153	19·82	− 4·18	20·19
666	July 10·00	23	106	20·88	69	20·48	+ 4·50	20·73
667	Aug. 6·21	27	39	21·28	82	22·55	− 8·40	22·14
668	Sept. 2·46	26	65	12·38	28	17·98	+ 3·23	14·07
669	29·73	27	228	13·88	960	21·23	−14·50	19·82
670	Oct. 27·02	27	376	17·13	704	22·42	− 8·67	20·58
671	Nov. 23·33	27	359	17·79	297	21·95	− 0·20	19·68

1904MNRAS..65..151.

TABLE IV.

Year.	No. of Days on which Photographs were taken.	Spots North of the Equator.		Spots South of the Equator.		Mean Heliographic Latitude of Entire Spotted Area.	Mean Distance from Equator of all Spots.
		Mean of Daily Areas.	Mean Heliographic Latitude.	Mean of Daily Areas.	Mean Heliographic Latitude.		
1901	359	22	8°·59	6·6	16°·27	+2°·82	10°·37
1902	349	42	18·81	21	15·29	+7·48	17·64
1903	350	133	18·12	206	21·10	−5·75	19·93

The principal features of the record for 1903 are :

1. The increase in area ;—the mean daily value for umbræ, whole spots, and faculæ being in each case between five and six times as great as in 1902, showing unmistakably that the revival of activity after minimum is in progress.

2. So far as umbræ and whole spots are concerned this increase was due chiefly to the remarkable activity shown in the last three months of the year, the mean daily area for the first nine months being less than one-half of that for the whole year.

3. The faculæ were less unevenly distributed through the year than the spots, the second half of the year being about twice as prolific as the first half.

4. Comparing the whole spots of the two hemispheres, the area for the northern has been to that of the southern as 39 to 61. This is contrary to the precedent of the last two cycles ; for in 1880 and 1881, and again in 1890 and 1891, when the solar activity was increasing, a marked superiority was shown by the northern hemisphere.

5. Neither hemisphere has been absolutely undisturbed for a complete rotation at any time during the year.

6. The number of days without spots in 1903 was 56, as compared with 248 in 1902 and 289 in 1901. The last day without spots in 1903 was September 22.

7. The distribution of spots in latitude has been very characteristic of a new cycle when in full progress. The chief activity has been in the zone 15° to 25° in both hemispheres, whilst the belt of activity from 7° to 10°, recognised in 1902, has been almost quiescent.

8. As compared with the corresponding years of the two preceding cycles the mean daily spotted area appears rather low when taken into consideration with the mean distance from the equator of all spots. In 1880 the area was 416, and mean distance from equator 19°·85 ; and in 1891 the corresponding values were 569 and 20°·31.

9. The number of separate groups of spots was more than four times as great as in 1902, being 150 in all, of which 60 were in the northern hemisphere and 90 in the southern.

Royal Observatory, Greenwich :
1904 *December* 6.

1904MNRAS..65..151.

Observations of the Leonid Meteors of 1904 *November at the Royal Observatory, Greenwich.*

(*Communicated by the Astronomer Royal.*)

A considerable number of Leonids were observed on the morning of November 15 (civil reckoning). The following table shows the number counted by two observers during the watch :

	G.C.T.	Number of Leonids.		G.C.T.	Number of Meteors.
d	h d h		d	h h	
Nov. 14	22½—15 0	5	Nov. 15	3½—4	52
	h h				
15	0—1	11		4 —4½	78
	1—2	18		4½—5	65
	2—3	22		5 —5½	58
	3—3½	11		5½—6½	22

The paths of the meteors were plotted till $3\frac{1}{2}^{\rm h}$, but from that time the meteors were counted only, so that the numbers possibly include a few not Leonids. Fog began to obscure the sky before $4\frac{1}{2}^{\rm h}$, so that the time of maximum is not determined with certainty. The largest number counted in any five minutes was 22 from $4^{\rm h}\ 5^{\rm m}$ to $4^{\rm h}\ 10^{\rm m}$.

A very fine meteor at $4^{\rm h}\ 25^{\rm m}$ was noted as brighter than *Jupiter* : length of path, 40° ; duration, 3 seconds. It burst, lighting up the sky, and left a trail which lasted 114 seconds.

In the early part of the watch, before $3\frac{1}{2}^{\rm h}$, 7 Leonids were noted of the first magnitude and four brighter, one leaving a trail for $60^{\rm s}$. The paths of 35 of the Leonids were 10° or longer.

The night of November 13–14 was foggy throughout. The night of November 15–16 was cloudy, with bright intervals till $2^{\rm h}$, when a thick fog set in. A few meteors were observed, including 10 Leonids, one of which was as bright as *Jupiter*. Through the fog a bright double flash was seen at $3^{\rm h}\ 39\frac{1}{2}^{\rm m}$, but no path could be traced.

The morning of November 17 was overcast till $5^{\rm h}$. Between $5^{\rm h}$ and $6\frac{1}{2}^{\rm h}$ 11 Leonids were observed.

Note on the Shower of Leonids in 1904. By W. F. Denning.

On November 14 the weather here was pretty favourable for observation in the earlier part of the night. Between $13^{\rm h}\ 30^{\rm m}$ and $15^{\rm h}\ 45^{\rm m}$ I watched the eastern region of the sky during about $1\frac{1}{2}^{\rm h}$, when there were fifty-five meteors, of which thirty-three were directed from the "Sickle." I concluded that Leonids were